REMARKS/ARGUMENTS

The Office Action of August 28, 2006 has been reviewed and carefully considered.

Original/previously presented claims 1 to 4 remain pending, and new claims 5 to 12 have been added. Claims 1 to 12 are now pending, of which each of claims 1 to 4 are independent, and each of claims 5 to 12 are variously dependent therefrom.

Reconsideration of the above-identified application, as herein amended, is respectfully requested.

Each of independent claims 1 to 4 stand rejected in the Office Action under 35 U.S.C. §103(a) as allegedly unpatentable over Harter (U.S. Patent 6,447,132) in view of Palalau (U.S. Patent 6,271,913). Applicant respectfully disagrees.

As applicant has previously explained (see, for example, applicant's "Pre-Appeal Brief Request for Review - Applicant's Arguments", the present invention is directed to a method (claims 1 and 4) and apparatus (claims 2 and 3) for variably illuminating a flat panel display with two different types of illumination based on the level of ambient light. In bright light (e.g. daylight), a fluorescent lamp illuminates the flat panel, while under low ambient light conditions (e.g., nighttime) one or more LEDs (light emitting diodes) illuminate the display. At an intermediate level of brightness (a "transition illumination level"), the two types of light are variably combined to provide a seamless transition between the predetermined upper and lower ranges of illumination. The inventive method and apparatus are most especially useful in controlling the internal or backlit illumination of a flat panel display on which flight-related information is presented to the flight crew in the cockpit of an aircraft, in which the display illumination level must be maintained - to avoid overwhelming the flight crew's vision with critical flight information displays illuminated with either too much, or too little, light - within a suitable range while smoothly varying the display

illumination, particularly as the critical transition between the high level fluorescent lamp and low-level LED-based illumination is effected.

The invention provides two types of illumination sensors (which are implemented by photosensors in the disclosed embodiments): one to monitor the light impinging on the panel (i.e. ambient light), and one to monitor the level of generated light that is illuminating the panel (i.e. the current display screen illumination level). The two monitored levels are compared and the supply of operating power to the fluorescent lamp and to the LEDs are adjusted so that at all times the proper, intended level of light illuminates the panel and is varied in an uninterruptedly smooth manner throughout the range of illumination which extends between a predetermined maximum illumination level suitable for viewing of the display screen in ambient daylight conditions and a predetermined minimum illumination level suitable for viewing of the display screen in ambient night conditions.

The key to the advance provided by the present invention is in its ability to provide an uninterruptedly smooth variation in the display screen illumination level in the region at and about the so-called "transition illumination level" -- i.e. the point at which the source of illumination for the display screen is switched between the high-output fluorescent lamp and the low output LED(s). The problem with illuminating the display screen in this transition region arises because of certain inherent operating characteristics of fluorescent lamps, namely *persistence* associated with deactivation of a fluorescent lamp, and the lag or delay in the emission of light from a fluorescent lamp when power is first applied to the lamp while the plasma in the fluorescent lamp energizes. To compensate for these characteristics of fluorescent lamps, the present invention monitors the *actual* "current display screen illumination level" and provides the monitored level to the controller which operates (i.e. supplies electrical operating power to) the fluorescent tube and the LED(s). By doing

so, uninterruptedly smooth variation of the display screen illumination level is assured as the screen illumination level is varied throughout its entire range between its predetermined maximum illumination level suitable for viewing of the display screen in ambient daylight conditions and its predetermined minimum illumination level suitable for viewing of the display screen in ambient night conditions, and most especially at and about the predetermined transition illumination level at which a change between the two (i.e. high and low level) sources of display illumination is effected. In the preferred forms of the invention disclosed by applicant, the display illumination level sensor is an optical photosensor.

The cited Harter patent discloses a two-level brightness control for a vehicle head up display (HUD) in which (Fig. 2) a high brightness light source 21 is operated to illuminate an image-projecting LCD electronic display 26 in bright or daylight conditions and a low brightness light source 22A, 22B is operated to illuminate the display in low light and nighttime conditions. Harter teaches that the high brightness light source 21 is preferably "one or more halogen bulbs that produce bright light 21A" (column 4, lines 20 to 22), and the low brightness light sources 22A and 22B are preferably "one more fluorescent lights suitable for producing low brightness light" (column 4, lines 45 to 47). Operation of the high and low brightness light level sources is based *solely* on a*mbient light conditions* which are monitored by a light sensor 17 mounted on the outside of the vehicle. The Examiner acknowledges that Harter fails to disclose monitoring of the current display screen illumination level, or the provision of a display illumination level sensor for monitoring the current display screen illumination level, and providing that monitored level to a display screen illumination controller that is operable for illuminating the display screen at the desired display screen illumination level, as each of applicant's claims recite. Thus, the Harter reference fails to teach or suggest monitoring of the current display screen illumination level, as

applicant's claims expressly recite, for use in varying the output of the [low level illumination source] LED(s) so as to smoothly and uninterruptedly maintain an intended overall display screen illumination level in the transition between daylight and nighttime ambient lighting conditions.

The Examiner cites the Palalau patent in an effort to remedy that deficiency.

Palalau discloses a method of controlling the brightness level of a screen display, also based *solely* on the sensed ambient light conditions. Palalau does so by monitoring the ambient light (using a "light-sensitive sensor that is capable of detecting the amount of ambient light in the general vicinity of the display screen" - see col. 2, ll.59-61) and comparing a voltage from the ambient light sensor to the current row voltage for the display pixels of the screen display; the screen display has a matrix of such pixels that, when variously activated, define the image to be displayed on the screen, and the greater the voltage supplied to each screen display pixel, the brighter the resulting image-defining point of light that is generated at that location on the display screen. In Palalau, the row voltage for the screen display pixels is varied until it is, in effect, equal to the output of the ambient light sensor to thereby adjust the brightness of the image-defining pixels in accordance with the output of the ambient light sensor. The Examiner's rejection is based on the view that this comparison of the row voltage to the output of the ambient light sensor equates to applicant's claimed "monitoring" of the current display screen illumination level and applicant's claimed providing of that monitored level to a display screen illumination level controller that is operable for illuminating the display screen at a predetermined desired display screen illumination level.

The Examiner's proffered combination of Harter and Palalau as a basis for the Section 103(a) rejection set forth in the Office Action fails both (i) because there is neither motivation nor suggestion nor teaching, absent impermissible hindsight reconstruction, to support that combination,

and (ii) because that combination of references, even if *arguendo* proper, fails to result in applicant's claimed invention.

First, Palalau merely discloses adjustment of the *brightness of the image-defining screen pixels* in accordance with the sensed level of *ambient light* -- it has nothing whatsoever to do with the adjustment of the backlit illumination (i.e. by LEDs) of an imaging display, as in the primary reference Harter. How, or why, the person of skill would be motivated to apply the Palalau teaching, such as it is, to the system of Harter is unknown and unexplained.

The Harter reference teaches a system in which the ambient light level is monitored and provided to a controller that is operable for illuminating the display screen by controlling a high brightness halogen lamp and a low brightness fluorescent lamp based on the monitored ambient light level. Palalau, on the other hand, adjusts the brightness level of the *screen pixels which create the displayed image*; there is no disclosure or teaching in Palalau for adjusting a high brightness lamp or illuminator and/or a low brightness lamp or illuminator or any other such display screen backlighting or sidelighting illuminator as present in the Harter reference; the screen pixels of Palalau, which create or define the image to be depicted on the display, are *not* display screen illuminators in the sense of those disclosed in the Harter reference.

Where, then, is the motivation of instruction for the person of skill to modify the Harter system using the teaching of Palalau? *How* is the person of skill supposed to adapt the pixel control arrangement of Palalau to modify the backlighting/sidelighting display illumination arrangement of Harter? And *why* would such a person of skill even consider such a modification? Harter teaches an apparatus for illuminating a display using high intensity halogen bulbs and low intensity fluorescent tubes. Palalau teaches varying of the display screen pixel voltage to control the intensity of the image generated on the display. Is it the Examiner's position that the person of skill would

somehow be motivated to combine these two system to smoothly vary the LED illumination at and about the transition level between the high and low intensity illumination sources of Harter? And how, exactly, would the person of skill modify the Harter system, which varies display illumination by varying high and low level intensity external illumination sources in accordance with sensed ambient light conditions, by applying the teachings of Palalau, which varies the brightness level of the image-defining display screen pixel, based on sensed ambient light conditions? Indeed, *why* would the person of skill even consider the Examiner's proffered modification, absent applicant's own teaching. The cited art contains absolutely *no* teaching or suggestion or motivation, or instruction, for such a modification or combination of the cited art.

Moreover, even if, *arguendo*, the Palalau reference is viewed (as alleged by the Examiner) as disclosing monitoring of the current display illumination level for use in controlling the adjustable illumination level, the Examiner's proposed inclusion of such monitoring in the Harter system can be based only on hindsight reconstruction with knowledge of the present invention for yet another reason. The present invention provides an improvement to prior art systems such as that of Harter in which high and low intensity light sources are variously operated to illuminate a backlit or sidelit display on the basis of ambient light conditions. Only the present invention teaches that, in order to make transitions between the high and low level ambient conditions as uninterruptedly smooth and seamless as possible, the low intensity source should be controlled based on, in *addition* to ambient light conditions, the actual sensed current illumination level of the display. Nothing in Harter indicates or suggests a need for such an improvement, and neither does Palalau indicate or suggest that its teaching relates to or could be utilized in a dual backlit display for adjusting the overall illumination level in the critical transition region by adjusting the output of the low light LED source to provide an uninterruptedly smooth transition between the high and low level

illumination sources. In short, neither reference teaches or mentions or suggests the problem solved by applicant's claimed invention, or provides *any* motivation for the combination proposed by the Examiner. Furthermore, the mere addition of the arrangement of Palalau for monitoring pixel row voltage to the system of Harter would have no effect on the problem solved by the present invention - i.e. the need to dynamically vary the illumination of the [low intensity light source] LED to overcome the nonlinear start-up and shut-down illumination characteristics of the [high intensity light source] fluorescent tube in the transition region - and neither would the person of skill be instructed by the references as to how their teachings might be so combined to do so.

Next, with respect to the ability of the proffered combination to disclose each of the claimed elements and limitations recited in applicant's claims, even assuming, *arguendo*, that there *is* sufficient motivation to combine the teachings of Harter and Palalau as suggested by the Examiner, such combination would *not* result in applicant's claimed invention. Each of applicant's independent claims 1 and 2 recites, at the end of each claim,

> "...varying the LED control signal in accordance with the monitored current display screen illumination level to assist the fluorescent tube in illuminating the display screen at the determined desired display screen illumination level as the fluorescent tube is initially powered, and discontinuing supply of the LED control signal to the at least one light emitting diode when the monitored current display screen illumination level indicates that the illumination output of the fluorescent tube is sufficient to illuminate the display screen to the determined desired display screen illumination level."

Similarly, each of independent claims 3 and 4 recite:

> ..."further varying the LED electrical control signal for predeterminately illuminating the display screen at and proximate the predetermined transition illumination level to one of
>
> (i) decrease the LED electrical control signal in accordance with the monitored current display screen illumination level and the present desired display screen illumination level to correct for fluorescent lamp persistence at fluorescent lamp shut-off, and
>
> (ii) increase the LED electrical control signal in accordance with the monitored current display screen illumination level and the present desired display screen illumination level to correct for fluorescent lamp start-up delays and fluorescent lamp start-up illumination level variations when the fluorescent lamp is initially powered on,
>
> to thereby maintain an uninterruptedly smooth variation in the display screen illumination level as the display screen illumination level is dynamically varied between the predetermined maximum display screen illumination level and the predetermined minimum display screen illumination level."

Modification of the Harter apparatus, in accordance with the teachings of Palalau - however, *arguendo*, that might be accomplished - would not result in an apparatus or method in which, *inter alia*, the supply of the LED control signal to the LED would be discontinued (as in claims 1 and 2) "when the monitored current display screen illumination level indicates that the illumination output

of the fluorescent tube is sufficient to illuminate the display screen to the determined desired display screen illumination level", since modification of Harter et al. with the Palalau teaching would provide no way to monitor the illumination level of the [high brightness light source] fluorescent lamp for use in controlling illumination of the [low brightness light source] LED. Similarly, with respect to claims 3 and 4, modification of Harter using the teachings of Palalau would not result in a method or apparatus in which the [low brightness light source] LED control signal is varied to, *inter alia*, "increase the LED electrical control signal in accordance with the monitored current display screen illumination level and present desired display screen illumination level to correct for fluorescent lamps start-up delays and fluorescent lamp start-up illumination level variations when the fluorescent lamp is initially powered on". The combination of Harter and Palalau, however that would be accomplished, would not (at the very least) meet those express claim recitations.

Neither would a combination of Harter and Palalau - again, *arguendo*,however that might be accomplished - provide applicant's claimed "smooth[ly]" variation of display screen illumination level between the maximum illumination level and the minimum illumination level (preamble, claims 1 to 4), most particularly at the transition illumination level, or the "uninterruptedly smooth variation of the display screen illumination level" between the maximum illumination level and the minimum illumination level (final clause, claims 3 and 4), again most particularly at the transition illumination level. Palalau simply teaches that the display screen pixel row voltage is changed as between three (at most) predetermined levels for, respectively, daylight, twilight, and nighttime ambient light conditions; thus, there is no "smooth" or "uninterruptedly smooth" variation of the display brightness level, as is recited in the applicant's claims, to maintain the desired illumination level and enable smooth or uninterruptedly smooth display illumination transitions between daylight and nighttime ambient conditions.

The Examiner's proferred combination of Harter and Palalau, therefore, *cannot* render applicant's claimed invention obvious even if, *arguendo*, that reference combination is suggested by anything other than hindsight reconstruction of applicant's claimed invention.

For all of the foregoing reasons, therefore, applicant maintains that the Section 103(a) rejection of claims 1 to 4 cannot properly stand, and must be withdrawn.

Newly added claims 5 to 12 recite that monitoring of the current display screen illumination level is optically effected, as for example using a photosensor. No new matter has been added to the application by way of claims 5 to 12.

Reconsideration of the patentability of applicant's claims, withdrawal of the Section 103(a) rejection, and early issuance of a Notice of Allowance are once more requested.

Respectfully submitted,

COHEN PONTANI LIEBERMAN & PAVANE LLP

By _____

Lance J. Lieberman
Reg. No. 28,437
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

Dated: February 28, 2007